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ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND WS--ETC F/6 4/2  
19305A MLRS, MISSILE NUMBERS 1083, 1132, 1141, 1142, 1143, ROUN--ETC(U)

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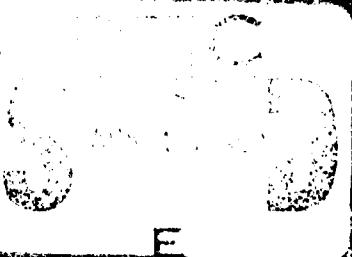
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| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  |  |   |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>Meteorological data gathered for the launching of 19305A MLRS, Missile<br>Numbers 1083, 1132, 1141, 1142, 1143, Round Numbers V-104, V-105, V-106, V-107<br>and V-108 are presented in tabular form. |  |   |

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## INTRODUCTION

19305A MLRS, Missile Numbers 1083, 1132, 1141, 1142 and 1143, Round Numbers V-104, V-105, V-106, V-107 and V-108, were launched from LC-33, White Sands Missile Range (WSMR), New Mexico, at 1000 MST on 23 January 1980. The schedule launch times were 0900 MST.

## DISCUSSION

Meteorological data were recorded and reduced by the White Sands Meteorological Team, Atmospheric Sciences Laboratory (ASL), White Sands Missile Range, New Mexico. The data were obtained by the following methods:

### 1. Observations

#### a. Surface

(1) Standard surface observations to include pressure, temperature ( $^{\circ}\text{C}$ ), relative humidity, dew point ( $^{\circ}\text{C}$ ), density ( $\text{gm/m}^3$ ), Wind direction and speed, and cloud cover were made at the LC-33 Met Site at T-0 minutes.

(2) Anemometer data were provided from existing pole-mounted and tower-mounted anemometers at LC-33. Monitor of wind speed and direction from one anemometer was also provided in the launch control room.

#### b. Upper Air

(1) Low level wind data were obtained from RAPTS T-9 pibal observation at:

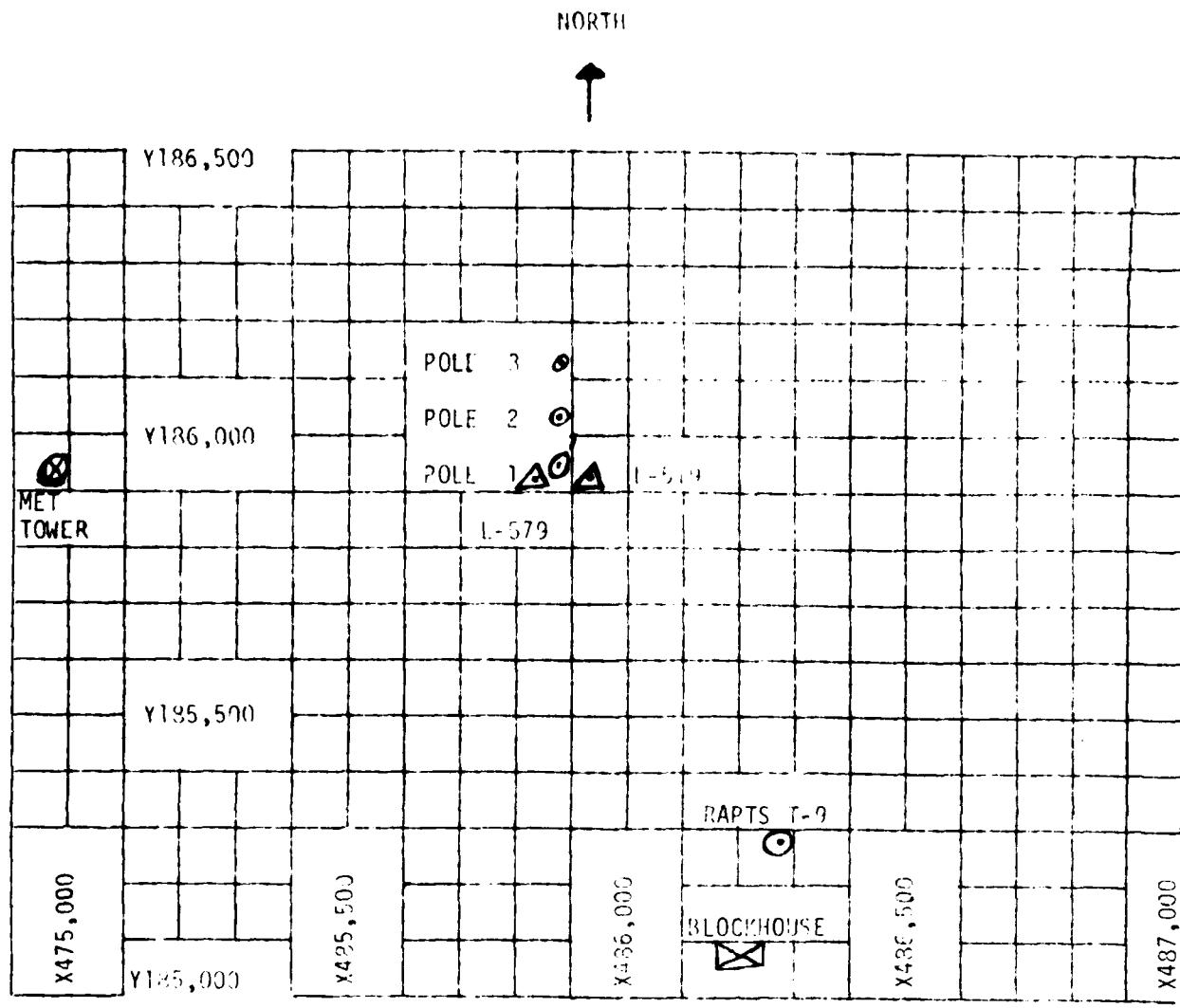
#### SITE AND ALTITUDE

LC-33 2Km  
Nick 2Km

(2) Air structure data (rawinsonde) were collected at the following Met Sites. Data were collected from surface to 78,000 feet in 500-foot increments.

#### SITE AND TIME

SMR 1000 MST



1. MET TOWER - 4 Bendix Model T-20 Anemometers at 12 ft., 52 ft., 102 ft., and 202 ft. with E/A recorders.
  2. POLE ANEMOMETER - Bendix Model T-120 with E/A recorders.
    - (a) Pole #1 - 38.7 ft.
    - (b) Pole #2 - 53.0 ft.
    - (c) Pole #3 - 83.6 ft.
  3. RAPTS T-9 Radar Automatic Pilot-Balloon Tracking System T-9 Radar.

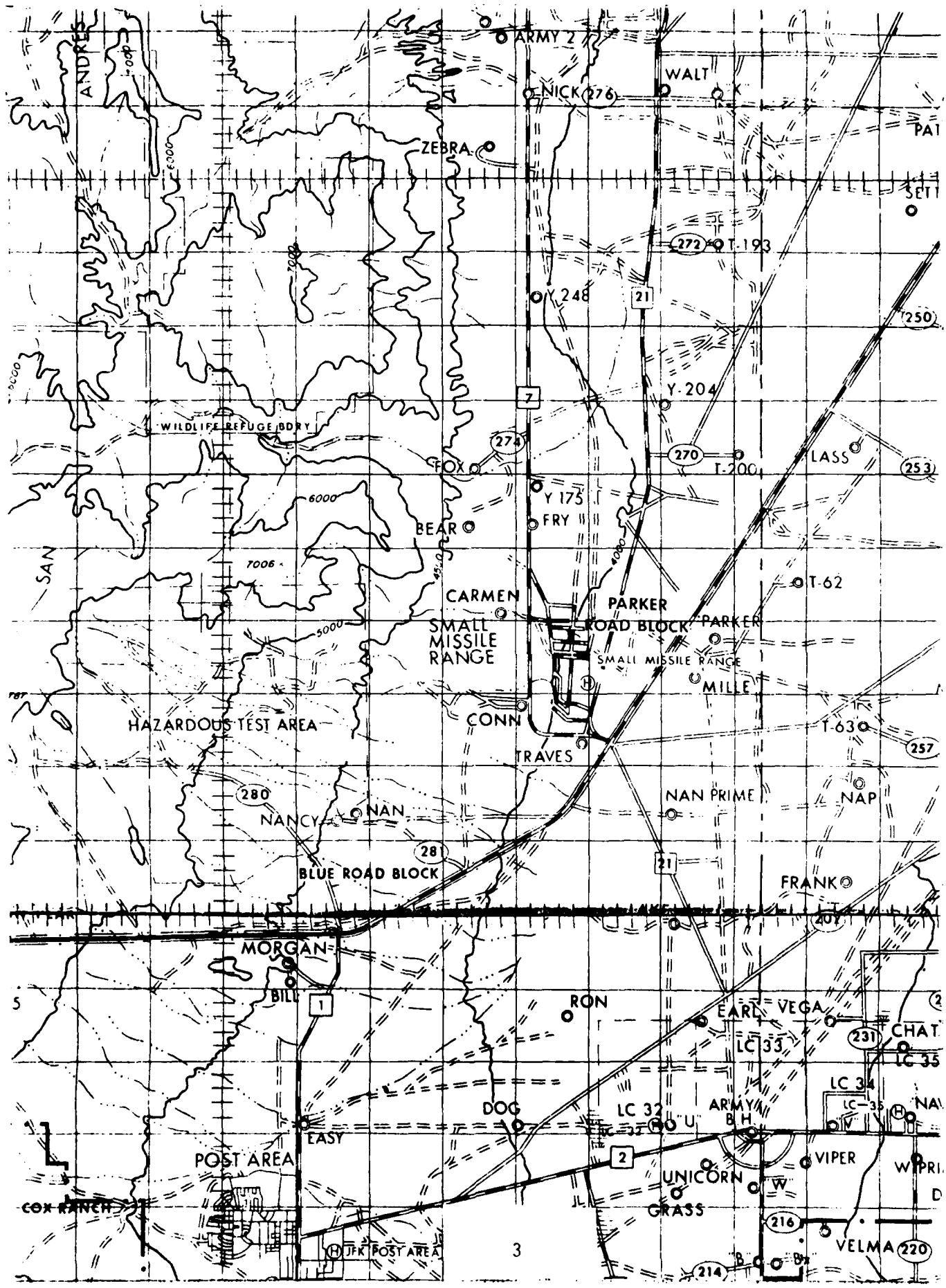


TABLE 1. Surface Observations taken at 1000 MST,  
23 January 1980, at LC-33, 19305A MLRS,  
Missile Numbers 1083, 1132, 1141, 1142  
and 1143, Round Numbers V-104, V-105,  
V-106, V-107 and V-108.

|                   |         |                   |
|-------------------|---------|-------------------|
| ELEVATION         | 3977.30 | FT/MSL            |
| PRESSURE          | 892.0   | MB                |
| TEMPERATURE       | -0.3    | °C                |
| RELATIVE HUMIDITY | 80      | %                 |
| DEW POINT         | -3.2    | °C                |
| DENSITY           | 1139.13 | GM/M <sup>3</sup> |
| WIND SPEED        | 06      | KTS               |
| WIND DIRECTION    | 360     | DEGREES           |
| CLOUD COVER       | CLEAR   |                   |

TABLE 2 LC-33 FIXED POLE ANEMOMETER MEASURED WINDS

| POLE #1    |         |           | POLE #2    |         |           | POLE #3    |         |           |
|------------|---------|-----------|------------|---------|-----------|------------|---------|-----------|
| T-TIME SEC | DIR DEG | SPEED KTS | T-TIME SEC | DIR DEG | SPEED KTS | T-TIME SEC | DIR DEG | SPEED KTS |
| -30        | 346     | 08        | -30        | 360     | 02        | -30        | 345     | 05        |
| -20        | 341     | 08        | -20        | 352     | 03        | -20        | 345     | 05        |
| -10        | 340     | 07        | -10        | 342     | 04        | -10        | 342     | 04        |
| 0.0        | 345     | 07        | 0.0        | 345     | 04        | 0.0        | 344     | 05        |
| +10        | 342     | 07        | +10        | 342     | 04        | +10        | 342     | 05        |

TABLE 3 LC-33 METEOROLOGICAL TOWER ANEMOMETER MEASURED WINDS (202 FT TOWER)

| LEVEL #1, 12 FEET<br>X484,982.64, Y185,057.73, H3983.00 (base) |         |           | LEVEL #2, 62 FEET<br>X484,982.64, Y185,057.73, H3983.00 (base) |         |           |
|--|---------|-----------|--|---------|-----------|
| T-TIME SEC   | DIR DEG | SPEED KTS | T-TIME SEC   | DIR DEG | SPEED KTS |
| -30  | 004     | 06        | -30  | 007     | 05        |
| -20  | 005     | 05        | -20  | 006     | 05        |
| -10  | 001     | 05        | -10  | 007     | 05        |
| 0.0  | 359     | 04        | 0.0  | 348     | 05        |
| +10  | 358     | 05        | +10  | 345     | 05        |

| LEVEL #3, 102 FEET<br>X484,982.64, Y185,057.73, H3983.00 (base) |         |           | LEVEL #4, 202 FEET<br>X484,982, Y185,057.73, H3983.00 (base) |         |           |
|---|---------|-----------|--|---------|-----------|
| T-TIME SEC  | DIR DEG | SPEED KTS | T-TIME SEC   | DIR DEG | SPEED KTS |
| -30   | 360     | 07        | -30  | 357     | 06        |
| -20   | 360     | 06        | -20  | 356     | 07        |
| -10   | 360     | 06        | -10  | 355     | 07        |
| 0.0   | 358     | 05        | 0.0  | 357     | 07        |
| +10   | 360     | 06        | +10  | 358     | 06        |

## PILOT BALLOON MEASURED WIND DATA

TABLE 4

RELEASED FROM LC-33

DATE 23 January 1980

TIME 1000 MST

TRACKER

COORDINATES (WSTM) : 486.037.24

86.037.24

Y 182,350.16

3977.30

NOTE: WIND DIRECTIONS ARE REFERENCED TO TRUE NORTH.

HEIGHTS ARE METERS AGL XX OR FEET AGL

## PILOT BALLOON MEASURED WIND DATA

TABLE 5

RELEASED FROM Nick Site DATE 23 January 1980 TIME 1000 MST

**TRACKER**      COORDINATES (WSTM)      X: 470,734.56      Y: 255,775.64      Z: 4126.57

NOTE: WIND DIRECTIONS ARE REFERENCED TO TRUE NORTH.

HEIGHTS ARE METERS AND XX OR FEET AND XX.

STATION ALTITUDE 3997.30 FEET MSL  
 23 JAN. 80 1000 HRS MST  
 ASCENSION NO. 16

SIGNIFICANT LEVEL DATA

0230060016

S M R

TABLE 6

GEODETIC COORDINATES  
 32°48'34" LAT DEG  
 106°42'30" LON LEG

| PRESSURE<br>MILLIBARS | GEOMETRIC<br>ALTITUDE<br>MSL FEET | TEMPERATURE<br>DEGREES CENTIGRADE | AIR DENSITY<br>CENTIGRADE | HELIUM<br>PERCENT |
|-----------------------|-----------------------------------|-----------------------------------|---------------------------|-------------------|
| 890.0                 | 3997.3                            | 1.8                               | -1.3                      | 80.0              |
| 887.0                 | 4086.5                            | .3                                | -4.0                      | 73.0              |
| 872.9                 | 4507.5                            | -1.4                              | -3.0                      | 69.0              |
| 856.8                 | 4996.7                            | .3                                | -4.7                      | 69.0              |
| 850.0                 | 5206.5                            | -.2                               | -5.8                      | 66.0              |
| 798.4                 | 6947.8                            | -2.1                              | -9.0                      | 59.0              |
| 779.0                 | 7490.4                            | -1.8                              | -16.7                     | 31.0              |
| 769.4                 | 7814.7                            | -1.2                              | -24.5                     | 15.0              |
| 722.4                 | 9461.0                            | -2.5                              | -23.5                     | 16.0              |
| 709.2                 | 9943.4                            | -.4                               | -22.4                     | 17.0              |
| 700.0                 | 10286.0                           | -.8                               | -23.4                     | 16.0              |
| 641.6                 | 12554.8                           | -4.6                              | -25.9                     | 17.0              |
| 581.4                 | 15077.0                           | -10.1                             | -30.4                     | 17.0              |
| 500.0                 | 18829.0                           | -19.7                             | -36.4                     | 17.0              |
| 451.0                 | 22388.8                           | -29.0                             | -45.7                     | 18.0              |
| 400.0                 | 24132.8                           | -32.4                             | -48.0                     | 18.0              |
| 388.4                 | 24013.8                           | -33.7                             | -49.7                     | 18.0              |
| 368.0                 | 26052.7                           | -36.1                             |                           |                   |
| 328.6                 | 288604.9                          | -42.6                             |                           |                   |
| 301.0                 | 30619.0                           | -44.9                             |                           |                   |
| 292.0                 | 31213.1                           | -45.5                             |                           |                   |
| 268.6                 | 33029.3                           | -49.9                             |                           |                   |
| 250.0                 | 34570.9                           | -51.0                             |                           |                   |
| 215.4                 | 37715.5                           | -57.7                             |                           |                   |
| 205.6                 | 38681.8                           | -58.5                             |                           |                   |
| 200.0                 | 39259.8                           | -54.0                             |                           |                   |
| 196.0                 | 39688.4                           | -52.7                             |                           |                   |
| 182.2                 | 41236.6                           | -54.2                             |                           |                   |
| 172.1                 | 42447.7                           | -52.1                             |                           |                   |
| 150.0                 | 45352.6                           | -56.4                             |                           |                   |
| 144.6                 | 46117.7                           | -57.7                             |                           |                   |
| 133.2                 | 47P28.4                           | -57.2                             |                           |                   |
| 112.0                 | 51409.7                           | -61.4                             |                           |                   |
| 105.4                 | 52654.2                           | -60.8                             |                           |                   |
| 100.0                 | 53727.3                           | -63.2                             |                           |                   |
| 81.0                  | 57988.5                           | -64.7                             |                           |                   |
| 70.0                  | 60735.3                           | -64.0                             |                           |                   |
| 54.4                  | 6602b.4                           | -64.9                             |                           |                   |
| 50.0                  | 67734.8                           | -62.5                             |                           |                   |
| 32.4                  | 76624.9                           | -60.5                             |                           |                   |

STATION ALTITUDE 997.30 FEET MSL  
23 JAN 80 1000 HRS MST  
ASCENSION NO. 16

SIGNIFICANT LEVEL DATA  
0230060010  
S M R  
TABLE 6 (CONT)

GEODETIC COORDINATES  
32.48034 LAT DEG  
106.42307 LON DEG

| PRESSURE  | GEOMETRIC<br>ALTITUDE | TEMPERATURE                        | KEL.HUM. |
|-----------|-----------------------|------------------------------------|----------|
| millibars | MSL FEET              | AIR DEPTH IN<br>DEGREES CENTIGRADE | PERCENT  |
| 30.0      | 78203.4               | -62.3                              |          |

STATION ALTITUDE 3997.30 FEET MSL  
23 JAN. 80 1000 HRS MST  
ASCENSION NO. 10

UPPER AIR DATA  
0230060016  
S A R  
TABLE 7

| GEOMETRIC ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE<br>AIR<br>DEGREES CENTIGRADE | REL. HUM.<br>PERCENT | DENSITY<br>GM/CUBIC<br>METER | SPEED OF<br>SOUND<br>KNOTS | DIRECTION<br>DEGREES(TN) | WIND DATA<br>SPEED<br>KNOTS | INDEX<br>OF<br>REFRACTION |
|--------------------------------|-----------------------|--|----------------------|------------------------------|----------------------------|--------------------------|-----------------------------|---------------------------|
| 3997.3                         | 990.0                 | 1.0                                      | -1.3                 | 80.0                         | 1125.0                     | 646.7                    | 45.0                        | 2.9                       |
| 4000.0                         | 989.9                 | 1.0                                      | -1.4                 | 79.6                         | 1125.1                     | 646.7                    |                             | 1.000278                  |
| 4500.0                         | 873.2                 | -1.4                                     | -3.0                 | 88.7                         | 1116.8                     | 642.9                    |                             | 1.000274                  |
| 5000.0                         | 656.7                 | 0.3                                      | -4.7                 | 69.0                         | 1099.4                     | 644.8                    |                             | 1.000264                  |
| 5500.0                         | 440.3                 | -0.5                                     | -6.3                 | 64.7                         | 1072.3                     | 643.8                    |                             | 1.000258                  |
| 6000.0                         | 224.7                 | -1.1                                     | -7.3                 | 62.6                         | 1054.3                     | 643.1                    |                             | 1.000253                  |
| 6500.0                         | 809.1                 | -1.7                                     | -8.3                 | 60.5                         | 1036.7                     | 642.4                    | 346.3                       | 6.1                       |
| 7000.0                         | 793.8                 | -2.0                                     | -10.5                | 52.4                         | 1016.6                     | 641.9                    | 319.0                       | 4.9                       |
| 7500.0                         | 778.7                 | -1.8                                     | -16.8                | 30.5                         | 998.9                      | 642.0                    | 287.0                       | 4.4                       |
| 8000.0                         | 644.0                 | -1.5                                     | -24.3                | 15.3                         | 976.7                      | 642.4                    | 255.5                       | 4.7                       |
| 8500.0                         | 449.3                 | -1.7                                     | -24.0                | 16.2                         | 961.6                      | 642.0                    | 224.7                       | 2.8                       |
| 9000.0                         | 335.3                 | -2.1                                     | -23.7                | 17.2                         | 944.7                      | 641.5                    | 307.1                       | 7                         |
| 9500.0                         | 211.3                 | -2.3                                     | -23.4                | 17.9                         | 927.4                      | 641.3                    | 223.3                       | 3.3                       |
| 10000.0                        | 107.7                 | -0.5                                     | -22.6                | 16.8                         | 903.6                      | 643.5                    | 255.8                       | 7.0                       |
| 10500.0                        | 894.3                 | -1.2                                     | -23.6                | 16.1                         | 886.8                      | 642.7                    | 255.2                       | 11.3                      |
| 11000.0                        | 681.4                 | -2.0                                     | -24.2                | 16.3                         | 874.6                      | 641.7                    | 267.2                       | 13.0                      |
| 11500.0                        | 668.1                 | -2.8                                     | -24.7                | 16.5                         | 860.0                      | 640.7                    | 277.0                       | 13.9                      |
| 12000.0                        | 656.4                 | -3.7                                     | -25.3                | 16.8                         | 846.9                      | 639.7                    | 26.2                        | 13.8                      |
| 12500.0                        | 643.0                 | -4.5                                     | -25.8                | 17.0                         | 833.4                      | 638.7                    | 24.4                        | 14.1                      |
| 13000.0                        | 630.5                 | -5.6                                     | -26.7                | 17.0                         | 820.6                      | 637.4                    | 20.9                        | 15.1                      |
| 13500.0                        | 618.3                 | -6.7                                     | -27.6                | 17.0                         | 806.0                      | 630.1                    | 17.2                        | 15.3                      |
| 14000.0                        | 606.4                 | -7.8                                     | -28.5                | 17.0                         | 795.7                      | 634.8                    | 12.5                        | 14.8                      |
| 14500.0                        | 594.7                 | -8.8                                     | -29.4                | 17.0                         | 783.5                      | 633.5                    | 9.3                         | 13.9                      |
| 15000.0                        | 583.2                 | -9.9                                     | -30.5                | 17.0                         | 771.6                      | 632.2                    | 6.7                         | 12.9                      |
| 15500.0                        | 571.0                 | -11.2                                    | -31.5                | 17.0                         | 759.9                      | 630.6                    | 8.6                         | 12.6                      |
| 16000.0                        | 560.2                 | -12.5                                    | -32.4                | 17.0                         | 748.4                      | 629.1                    | 11.0                        | 12.5                      |
| 16500.0                        | 549.1                 | -13.7                                    | -33.4                | 17.0                         | 737.2                      | 627.5                    | 11.7                        | 12.5                      |
| 17000.0                        | 538.4                 | -15.0                                    | -34.5                | 17.0                         | 726.1                      | 626.0                    | 15.5                        | 13.0                      |
| 17500.0                        | 527.4                 | -16.3                                    | -35.6                | 17.0                         | 715.2                      | 624.4                    | 15.8                        | 13.7                      |
| 18000.0                        | 516.9                 | -17.6                                    | -36.6                | 17.0                         | 704.5                      | 622.9                    | 23.8                        | 14.6                      |
| 18500.0                        | 506.7                 | -18.9                                    | -37.7                | 17.0                         | 694.0                      | 621.3                    | 31.3                        | 15.5                      |
| 19000.0                        | 496.4                 | -20.1                                    | -38.8                | 17.0                         | 683.5                      | 619.7                    | 37.8                        | 15.4                      |
| 19500.0                        | 486.2                 | -21.3                                    | -39.8                | 17.2                         | 672.6                      | 618.1                    | 41.0                        | 15.0                      |
| 20000.0                        | 476.2                 | -22.8                                    | -40.8                | 17.3                         | 662.4                      | 616.5                    | 40.7                        | 14.0                      |
| 20500.0                        | 466.3                 | -24.1                                    | -41.8                | 17.5                         | 652.1                      | 614.9                    | 39.3                        | 12.6                      |
| 21000.0                        | 456.7                 | -25.4                                    | -42.8                | 17.6                         | 642.0                      | 613.3                    | 37.4                        | 11.6                      |
| 21500.0                        | 447.3                 | -26.7                                    | -43.9                | 17.8                         | 632.1                      | 611.0                    | 34.8                        | 10.3                      |
| 22000.0                        | 438.0                 | -28.0                                    | -44.9                | 17.9                         | 622.4                      | 610.0                    | 26.3                        | 9.9                       |
| 22500.0                        | 429.0                 | -29.2                                    | -45.9                | 18.0                         | 612.5                      | 608.5                    | 15.5                        | 10.6                      |
| 23000.0                        | 419.9                 | -30.2                                    | -46.7                | 18.0                         | 602.0                      | 607.3                    | 1.4                         | 12.3                      |

XX WIND DATA INVALID DUE TO MISSING RAW AZIMUTH, AND ELEVATION ANGLES.

STATION ALTITUDE 3997.30 FEET MSL  
23 JAN. 60 1000 HRS MSL  
ASCENSION NO. 16

UPPER AIR DATA  
0230060016  
S M R

TABLE 7 (CONT)

GEODETIC COORDINATES  
32.48034 LAT DEG  
106.42307 LON DEG

| GEOME INC ALTITUDE MSL FEET | PRESSURE MILLIBARS | TEMPERATURE AIR DEGREE C | DEWPOINT DEGREES CENTIGRADE | REL.HUM. PERCENT | DENSITY GM/CUBIC METER | SOUND SPEED KNOTS | WIND DATA DIRECTION DEGREES(TINI) | INDEX OF REFRACTION |
|-----------------------------|--------------------|--------------------------|-----------------------------|------------------|------------------------|-------------------|-----------------------------------|---------------------|
| 23500.0                     | 411.0              | -31.2                    | -47.5                       | 18.0             | 591.6                  | 606.0             | 352.3                             | 14.7                |
| 24000.0                     | 402.0              | -32.1                    | -48.4                       | 18.0             | 581.4                  | 604.8             | 345.4                             | 15.8                |
| 24500.0                     | 393.7              | -33.1                    | -49.2                       | 18.0             | 571.3                  | 603.6             | 339.5                             | 17.0                |
| 25000.0                     | 385.3              | -34.1                    | -51.4                       | 15.3**           | 561.3                  | 602.4             | 335.6                             | 17.9                |
| 25500.0                     | 377.0              | -35.0                    | -57.4                       | 8.0**            | 551.5                  | 601.2             | 331.2                             | 18.8                |
| 26000.0                     | 368.8              | -36.0                    | -74.9                       | .8**             | 541.8                  | 599.9             | 324.8                             | 19.7                |
| 26500.0                     | 360.8              | -37.2                    |                             |                  | 532.7                  | 598.4             | 317.4                             | 20.6                |
| 27000.0                     | 352.9              | -38.5                    |                             |                  | 523.9                  | 596.8             | 308.0                             | 21.6                |
| 27500.0                     | 345.1              | -39.8                    |                             |                  | 515.2                  | 595.1             | 300.5                             | 23.3                |
| 28000.0                     | 337.5              | -41.1                    |                             |                  | 506.6                  | 593.5             | 295.2                             | 25.6                |
| 28500.0                     | 330.1              | -42.3                    |                             |                  | 498.3                  | 591.9             | 291.5                             | 29.0                |
| 29000.0                     | 322.8              | -43.1                    |                             |                  | 488.7                  | 591.0             | 289.2                             | 33.4                |
| 29500.0                     | 315.6              | -43.6                    |                             |                  | 479.0                  | 590.2             | 265.8                             | 37.7                |
| 30000.0                     | 308.5              | -44.2                    |                             |                  | 469.4                  | 589.5             | 281.6                             | 42.1                |
| 30500.0                     | 301.6              | -44.8                    |                             |                  | 460.1                  | 588.7             | 277.9                             | 46.0                |
| 31000.0                     | 294.8              | -45.3                    |                             |                  | 450.8                  | 588.1             | 274.2                             | 49.8                |
| 31500.0                     | 288.2              | -46.2                    |                             |                  | 442.3                  | 586.9             | 271.1                             | 52.7                |
| 32000.0                     | 281.6              | -47.4                    |                             |                  | 434.6                  | 585.3             | 268.4                             | 55.3                |
| 32500.0                     | 275.2              | -48.6                    |                             |                  | 427.0                  | 583.8             | 265.9                             | 59.9                |
| 33000.0                     | 269.0              | -49.8                    |                             |                  | 419.6                  | 582.2             | 263.9                             | 65.0                |
| 33500.0                     | 262.8              | -50.2                    |                             |                  | 410.7                  | 581.7             | 262.9                             | 70.0                |
| 34000.0                     | 256.7              | -50.6                    |                             |                  | 401.9                  | 581.2             | 262.2                             | 76.0                |
| 34500.0                     | 250.8              | -50.9                    |                             |                  | 393.2                  | 580.7             | 262.5                             | 76.3                |
| 35000.0                     | 245.0              | -51.9                    |                             |                  | 385.7                  | 579.5             | 263.0                             | 76.8                |
| 35500.0                     | 239.0              | -53.0                    |                             |                  | 378.5                  | 578.1             | 265.0                             | 75.0                |
| 36000.0                     | 233.6              | -54.0                    |                             |                  | 371.5                  | 576.7             | 267.4                             | 72.8                |
| 36500.0                     | 228.2              | -55.1                    |                             |                  | 364.5                  | 575.3             | 268.7                             | 68.5                |
| 37000.0                     | 222.8              | -56.2                    |                             |                  | 357.8                  | 573.9             | 269.7                             | 63.4                |
| 37500.0                     | 217.6              | -57.2                    |                             |                  | 351.1                  | 572.4             | 269.3                             | 58.8                |
| 38000.0                     | 212.5              | -57.9                    |                             |                  | 343.9                  | 571.5             | 266.9                             | 54.9                |
| 38500.0                     | 207.4              | -58.5                    |                             |                  | 336.4                  | 571.0             | 264.4                             | 51.4                |
| 39000.0                     | 202.3              | -58.0                    |                             |                  | 324.9                  | 574.1             | 262.6                             | 49.1                |
| 39500.0                     | 197.1              | -53.3                    |                             |                  | 313.3                  | 577.7             | 262.3                             | 46.8                |
| 40000.0                     | 193.1              | -53.0                    |                             |                  | 305.6                  | 578.0             | 265.8                             | 44.6                |
| 40500.0                     | 188.6              | -53.0                    |                             |                  | 299.2                  | 577.4             | 269.4                             | 42.7                |
| 41000.0                     | 184.2              | -54.0                    |                             |                  | 292.8                  | 576.8             | 272.4                             | 41.0                |
| 41500.0                     | 180.0              | -53.7                    |                             |                  | 285.7                  | 577.1             | 275.1                             | 38.9                |
| 42000.0                     | 175.8              | -52.9                    |                             |                  | 278.0                  | 578.4             | 274.1                             | 33.7                |
| 42500.0                     | 171.7              | -52.2                    |                             |                  | 270.6                  | 579.1             | 272.9                             | 29.1                |
| 43000.0                     | 167.7              | -52.9                    |                             |                  | 265.2                  | 578.1             | 273.2                             | 29.6                |

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3997.30 FEET MSL  
23 JAN. 60 1000HRS MST  
ASCENSION NO. 10

UPPER AIR DATA  
0230060016  
S M R

GEODETIC COORDINATES  
32°46.034 LAT DEG  
106°42.307 LON DEG

TABLE 7 (CONT)

| GEOMETRIC ALTITUDE MSL FEET | PRESSURE MILLIBARS | TEMPERATURE AIR DEGREES CENTIGRADE | REL.HUM. PERCENT | GMI/CUBIC METER | SOUND SPEED KNOTS | DIRECTION DEGREES (TN) | WIND DATA SPEED KNOTS | INDEX OF REFRACTION |
|-----------------------------|--------------------|------------------------------------|------------------|-----------------|-------------------|------------------------|-----------------------|---------------------|
| 43500.0                     | 163.7              | -53.7                              |                  |                 | 259.9             | 577.2                  | 273.6                 | 30.3                |
| 44000.0                     | 159.9              | -54.4                              |                  |                 | 254.7             | 576.2                  | 275.1                 | 34.6                |
| 44500.0                     | 156.2              | -55.1                              |                  |                 | 249.6             | 575.2                  | 276.3                 | 38.9                |
| 45000.0                     | 152.5              | -55.9                              |                  |                 | 244.5             | 574.2                  | 277.7                 | 39.4                |
| 45500.0                     | 148.9              | -56.7                              |                  |                 | 239.7             | 573.2                  | 279.3                 | 39.1                |
| 46000.0                     | 145.4              | -57.5                              |                  |                 | 234.9             | 572.1                  | 280.9                 | 36.8                |
| 46500.0                     | 142.0              | -57.6                              |                  |                 | 229.4             | 572.0                  | 285.0                 | 33.3                |
| 47000.0                     | 138.6              | -57.4                              |                  |                 | 223.8             | 572.2                  | 285.4                 | 30.3                |
| 47500.0                     | 135.3              | -57.3                              |                  |                 | 218.4             | 572.4                  | 288.3                 | 27.9                |
| 48000.0                     | 132.1              | -57.4                              |                  |                 | 213.3             | 572.2                  | 291.0                 | 26.3                |
| 48500.0                     | 128.9              | -58.0                              |                  |                 | 208.8             | 571.5                  | 292.8                 | 26.1                |
| 49000.0                     | 125.9              | -58.6                              |                  |                 | 204.3             | 570.7                  | 293.8                 | 25.8                |
| 49500.0                     | 122.8              | -59.2                              |                  |                 | 200.0             | 569.9                  | 292.3                 | 25.2                |
| 50000.0                     | 119.9              | -59.7                              |                  |                 | 195.7             | 569.1                  | 290.7                 | 24.6                |
| 50500.0                     | 117.0              | -60.3                              |                  |                 | 191.6             | 568.3                  | 287.0                 | 24.4                |
| 51000.0                     | 114.2              | -60.9                              |                  |                 | 187.5             | 567.5                  | 285.2                 | 24.3                |
| 51500.0                     | 111.5              | -61.4                              |                  |                 | 183.4             | 567.0                  | 281.4                 | 24.0                |
| 52000.0                     | 108.8              | -61.1                              |                  |                 | 178.8             | 567.3                  | 280.2                 | 23.7                |
| 52500.0                     | 106.2              | -60.9                              |                  |                 | 174.3             | 567.6                  | 279.3                 | 23.2                |
| 53000.0                     | 103.6              | -61.6                              |                  |                 | 170.0             | 566.7                  | 278.0                 | 22.4                |
| 53500.0                     | 101.1              | -62.7                              |                  |                 | 167.4             | 565.2                  | 277.9                 | 21.6                |
| 54000.0                     | 98.7               | -63.5                              |                  |                 | 163.8             | 564.4                  | 276.1                 | 20.7                |
| 54500.0                     | 96.3               | -63.5                              |                  |                 | 159.9             | 564.1                  | 274.1                 | 20.0                |
| 55000.0                     | 93.9               | -63.6                              |                  |                 | 156.1             | 563.9                  | 270.8                 | 21.0                |
| 55500.0                     | 91.6               | -63.8                              |                  |                 | 152.5             | 563.6                  | 267.7                 | 22.1                |
| 56000.0                     | 89.4               | -64.0                              |                  |                 | 148.9             | 563.4                  | 265.7                 | 23.9                |
| 56500.0                     | 87.2               | -64.2                              |                  |                 | 145.3             | 563.2                  | 264.1                 | 25.9                |
| 57000.0                     | 85.1               | -64.4                              |                  |                 | 141.9             | 562.9                  | 267.5                 | 27.0                |
| 57500.0                     | 83.0               | -64.5                              |                  |                 | 138.6             | 562.7                  | 275.2                 | 27.6                |
| 58000.0                     | 81.0               | -64.7                              |                  |                 | 135.3             | 562.5                  | 283.3                 | 28.7                |
| 58500.0                     | 79.9               | -64.6                              |                  |                 | 131.9             | 562.6                  | 293.7                 | 30.3                |
| 59000.0                     | 77.9               | -64.5                              |                  |                 | 128.0             | 562.8                  | 302.7                 | 32.7                |
| 59500.0                     | 75.2               | -64.5                              |                  |                 | 125.4             | 563.0                  | 310.0                 | 33.0                |
| 60000.0                     | 73.3               | -64.2                              |                  |                 | 122.3             | 563.1                  | 317.0                 | 33.5                |
| 60500.0                     | 71.3               | -64.1                              |                  |                 | 119.2             | 563.3                  | 321.9                 | 31.4                |
| 61000.0                     | 69.8               | -64.0                              |                  |                 | 116.2             | 563.4                  | 320.4                 | 27.1                |
| 61500.0                     | 68.1               | -64.1                              |                  |                 | 113.4             | 563.3                  | 321.3                 | 23.3                |
| 62000.0                     | 66.4               | -64.2                              |                  |                 | 110.7             | 563.2                  | 339.0                 | 20.5                |
| 62500.0                     | 64.8               | -64.3                              |                  |                 | 108.0             | 563.0                  | 337.4                 | 17.8                |
| 63000.0                     | 63.2               | -64.4                              |                  |                 | 105.4             | 562.9                  | 339.7                 | 17.1                |

STATION ALTITUDE 3947.30 FEET MSL  
29 JAN. 60 1000 HRS MST  
ASCENSION NO. 10

UPPER AIR DATA  
0230060016  
S N R

TABLE 7 (CONT)

| GEOMETRIC ALTITUDE<br>MSL FEET | PRESSURE<br>MILLIBARS | TEMPERATURE<br>AIR<br>DEGREES CENTIGRADE | REL.HUM.<br>PERCENT | SPEED OF<br>SOUND<br>METER<br>KNOTS | WIND DATA<br>DIRECTION<br>DEGREES (TN) | SPEED<br>KNOTS | INDEX<br>OF<br>REFRACTION |
|--------------------------------|-----------------------|--|---------------------|-------------------------------------|--|----------------|---------------------------|
| 6400.0                         | 61.0                  | -64.5                                    |                     | 102.9                               | 562.8                                  | 342.0          | 16.7                      |
| 6400.0                         | 60.1                  | -64.5                                    |                     | 100.4                               | 562.7                                  | 342.4          | 16.8                      |
| 6400.0                         | 59.7                  | -64.6                                    |                     | 98.0                                | 562.6                                  | 340.5          | 17.4                      |
| 6400.0                         | 57.2                  | -64.7                                    |                     | 95.7                                | 562.4                                  | 338.7          | 16.2                      |
| 6400.0                         | 56.8                  | -64.8                                    |                     | 93.4                                | 562.3                                  | 336.6          | 20.5                      |
| 6600.0                         | 54.5                  | -64.9                                    |                     | 91.1                                | 562.2                                  | 335.5          | 22.8                      |
| 6600.0                         | 53.1                  | -64.2                                    |                     | 89.6                                | 563.1                                  | 336.6          | 22.4                      |
| 6600.0                         | 51.8                  | -63.5                                    |                     | 86.2                                | 564.0                                  | 350.3          | 20.9                      |
| 67500.0                        | 50.6                  | -62.8                                    |                     | 83.8                                | 565.0                                  | 2.8            | 20.0                      |
| 68000.0                        | 49.4                  | -62.4                                    |                     | 81.6                                | 565.5                                  | 14.3           | 17.9                      |
| 68500.0                        | 48.2                  | -62.3                                    |                     | 79.6                                | 565.7                                  | 26.3           | 16.6                      |
| 69000.0                        | 47.0                  | -62.2                                    |                     | 77.6                                | 565.8                                  | 34.1           | 14.5                      |
| 69500.0                        | 45.9                  | -62.1                                    |                     | 75.7                                | 566.0                                  | 32.1           | 11.3                      |
| 70000.0                        | 44.8                  | -62.0                                    |                     | 73.9                                | 566.1                                  | 28.3           | 8.2                       |
| 70500.0                        | 43.7                  | -61.9                                    |                     | 72.0                                | 566.3                                  | 17.2           | 8.7                       |
| 71000.0                        | 42.6                  | -61.8                                    |                     | 70.3                                | 566.4                                  | 7.7            | 9.6                       |
| 71500.0                        | 41.5                  | -61.7                                    |                     | 68.5                                | 566.6                                  | 4.4            | 10.4                      |
| 72000.0                        | 40.6                  | -61.5                                    |                     | 66.8                                | 566.7                                  | 6.4            | 11.0                      |
| 72500.0                        | 39.6                  | -61.4                                    |                     | 65.2                                | 566.9                                  | 8.3            | 11.6                      |
| 73000.0                        | 38.7                  | -61.3                                    |                     | 63.6                                | 567.0                                  | 6.3            | 11.6                      |
| 73500.0                        | 37.7                  | -61.2                                    |                     | 62.0                                | 567.2                                  | 6.1            | 11.6                      |
| 74000.0                        | 36.6                  | -61.1                                    |                     | 60.5                                | 567.3                                  | 6.6            | 11.5                      |
| 74500.0                        | 35.7                  | -61.0                                    |                     | 59.0                                | 567.5                                  | 5.1            | 11.5                      |
| 75000.0                        | 35.1                  | -60.9                                    |                     | 57.6                                | 567.6                                  | 3.5            | 11.5                      |
| 75500.0                        | 34.2                  | -60.8                                    |                     | 56.1                                | 567.8                                  | 5.0            | 11.4                      |
| 76000.0                        | 33.4                  | -60.6                                    |                     | 54.8                                | 567.9                                  | 11.5           | 11.5                      |
| 76500.0                        | 32.6                  | -60.5                                    |                     | 53.4                                | 568.1                                  |                | 1.000012                  |
| 77000.0                        | 31.8                  | -60.9                                    |                     | 52.2                                | 567.5                                  |                | 1.000012                  |
| 77500.0                        | 31.0                  | -61.5                                    |                     | 51.1                                | 566.8                                  |                | 1.000011                  |
| 78000.0                        | 30.3                  | -62.1                                    |                     | 50.0                                | 566.0                                  |                | 1.000011                  |

STATION ALTITUDE 3997.30 FEET MSL  
23 JAN. 60 1000 HRS MST  
ASCENSION NO. 16

MANDATORY LEVELS  
0230000010,  
S M R

TABLE 8

GEOGRAPHIC COORDINATES  
32°48'34" LAT DEG  
106°42'30" LONG DEG

| PRESUMED GEOPOTENTIAL<br>MILLIBARS | TEMPERATURE<br>AIR<br>DEGREES CENIGRADE | REL.HUM.<br>PERCENT | WIND DATA,<br>DIRECTION<br>DEGREES (TN)<br>KNOTS |
|------------------------------------|---|---------------------|--|
| 650.0                              | 5203.                                   | -2                  | -5.8 66. 9999.0 9999.0xx                         |
| 600.0                              | 6790.                                   | -2.0                | -8.9 59. 331.9 5.2                               |
| 750.0                              | 8475.                                   | -1.7                | -24.0 16. 254.5 2.9                              |
| 700.0                              | 10276.                                  | -1.6                | -23.4 16. 25.4 9.4                               |
| 650.0                              | 12205.                                  | -4.0                | -25.5 17. 25.9 13.8                              |
| 600.0                              | 14260.                                  | -8.3                | -29.0 17. 10.4 14.4                              |
| 550.0                              | 16453.                                  | -13.6               | -33.4 17. 11.7 12.5                              |
| 500.0                              | 18803.                                  | -19.7               | -38.4 17. 35.4 15.4                              |
| 450.0                              | 21136.                                  | -26.3               | -43.6 16. 35.0 10.7                              |
| 400.0                              | 24073.                                  | -32.4               | -48.6 16. 34.5.8 16.1                            |
| 350.0                              | 27143.                                  | -39.0               |  |
| 300.0                              | 30559.                                  | -44.9               |  |
| 250.0                              | 34497.                                  | -51.0               |  |
| 200.0                              | 39167.                                  | -54.0               |  |
| 175.0                              | 41986.                                  | -52.7               |  |
| 150.0                              | 45232.                                  | -56.4               |  |
| 125.0                              | 49009.                                  | -58.7               |  |
| 100.0                              | 53363.                                  | -63.2               |  |
| 80.0                               | 58048.                                  | -64.6               |  |
| 70.0                               | 60728.                                  | -64.0               |  |
| 60.0                               | 63822.                                  | -64.6               |  |
| 50.0                               | 67482.                                  | -62.5               |  |
| 40.0                               | 72010.                                  | -61.5               |  |
| 30.0                               | 77673.                                  | -62.3               |  |